



DEEPA DIVE SUMMARIES

- ◇ Do Adolescent Personality Traits Influence Fruit & Veg Intake?
- ◇ Is Vitamin E Effective for Treating Fatty Liver Disease?
- ◇ Can a Kinda-Mediterranean Diet Prevent Brain Atrophy?
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- ◇ What Dietary Interventions Reduce Insulin Resistance in PCOS?

Do Adolescent Personality Traits Influence Fruit & Veg Intake?

Conner TS, Thompson LM, Knight RL, Flett JA, Richardson AC, Brookie KL. The Role of Personality Traits in Young Adult Fruit and Vegetable Consumption. *Frontiers in Psychology*. 2017 Feb 7;8:119.

Background

- While genetics are often viewed as deterministic, behaviours – although not necessarily easy to change – are, ultimately, malleable.
- Research is starting to understand more in relation to the how nutrition habits during childhood and adolescence may form and sustain into adulthood.
- As characteristics of individuals that influence behaviours, personality traits in adolescence may influence dietary behaviours, with relevance for longer term health habits.

The Study

- The ‘Big Five’ personality traits were assessed in New Zealand undergraduate students. Intake of fruit, vegetables, chips/fries, and cookies/candy were dietary outcomes. The analysis tested the associations with each of the Big Five personality traits and intakes of each of the four dietary outcomes.

Findings, Strengths & Limitations

- Higher extraversion scores were associated with 0.34 and 0.52 more daily fruit servings, while conscientiousness was also associated with 0.22 and 0.38 more servings of fruit and vegetables, respectively, per day. Openness was also associated with 0.26 and 0.37 more fruit and vegetable servings per day.
- While the study had a large number of food diaries, the method of dietary assessment was superficial and arbitrary defined ‘healthy’ and ‘unhealthy’ foods without wider context. The main strength of the study is the use of well-validated personality trait assessment.

Context

- It is important to bear in mind that the specific personality traits associated with fruit and vegetable intake in this cohort would also predict intake in, for example, a sample of UK university students.
- The wider literature suggests that personality traits such as openness and conscientiousness are more consistently associated with positive dietary behaviours.
- Overall, the literature more consistently appears to associate personality traits of neuroticism with negative dietary behaviours.
- Many of the available analyses on personality traits and diet do not measure or include these other important factors, so at this point it is not possible to truly determine what extent personality traits *per se* influence diet.

Application

- These areas of research help us draw on different concepts to see paint a bigger picture of the myriad factors that influence food choice.
- The actual contribution of personality traits to dietary intake was modest, and could be overcome with attention to behaviours.
- We may not be able to modify whether someone is higher on openness or neuroticism, but we should always bear in mind that behaviours and diet are modifiable [although this does *not* mean easy].

Is Vitamin E Effective for Treating Fatty Liver Disease?

Vadarlis A, Antza C, Bakaloudi DR, et al. Systematic review with meta-analysis: The effect of vitamin E supplementation in adult patients with non-alcoholic fatty liver disease. *Journal of Gastroenterology and Hepatology*. 2021;36(2):311-319.

Background

- Much of the nutritional focus for the presence, and removal, of fat in the liver emphasises total energy intake and macronutrient composition.
- As the major fat-soluble antioxidant, vitamin E exerts several effects which may improve the clinical presentations of NAFLD/NASH, including anti-oxidative and anti-inflammatory activities.

The Study

- The investigators conducted a systematic review of vitamin E [in either tocopherol and/or tocotrienol forms] supplementation confined to RCTs in adults with NAFL/NASH, compared to placebo control, with the primary outcome of changes in the liver enzymes ALT/AST.

Findings, Strengths & Limitations

- Vitamin E supplementation resulted in a significant decrease of ALT by 7.37IU/L and AST by 5.71IU/L, which was stronger in participants with elevated baseline ALT/AST [12.40IU/L and 16.15IU/L, respectively].
- Liver fat decreased by 0.61%, while LDL-C decreased by 4.39mg/dL.
- The strengths of the study were the clearly defined inclusion criteria, the inclusion of both tocopherol and tocotrienol supplements, and the subgroup analyses.
- The limitations include the shoddy reporting, inconsistencies in the data presentation, lack of presentation of units of measurement, and small sample sizes of included studies.

Context

- Prior research suggested the benefit of vitamin E was confined to NASH, but although the magnitude of effect is clearly greatest in participants with NASH, vitamin E supplementation may provide a moderate benefit to a fatty liver before full-blown NASH.
- The tocotrienols may be of particular interest for fatty liver, however, we currently lack better understanding for both the optimal isoform(s) of tocotrienols and effective dose thereof in adults with liver disease.
- Despite limitations, this study provides a degree of confirmatory evidential synthesis of the benefits to vitamin E supplementation on markers of liver function in adults with NAFLD.
- Some open questions remain, in particular related to the application in NAFL without confirmed NASH, and in relation to the potential therapeutic efficacy of tocotrienols.

Application

- For the clinicians among you working in this area, vitamin E supplementation – which at this point in terms of strength of evidence does appear to be natural form α -tocopherol – is supported as an adjuvant option for the treatment of NAFLD, specifically NASH.
- However, there is no evidence to recommend broad supplementation for general liver health or prevention.
- In the context of general health and nutrients, a food-first approach emphasising dietary intake is always going to be the default.

Can a Kinda-Mediterranean Diet Prevent Brain Atrophy?

Kaplan A, Zelicha H, Yaskolka Meir A, et al. The effect of a high-polyphenol Mediterranean diet (Green-MED) combined with physical activity on age-related brain atrophy: the Dietary Intervention Randomized Controlled Trial Polyphenols Unprocessed Study (DIRECT PLUS). *American Journal of Clinical Nutrition*. 2022;115(5):1270-1281.

Background

- The EPIC-Spain Dementia Cohort Study, which showed a 20% lower risk of dementia with higher Mediterranean diet scores.
- Many of the intervention trials investigating the effects of (poly)phenol compounds have been conducted over 12-weeks, while some of the berry anthocyanin interventions have tested cognition acutely over a 6-hour period.
- However, longer-term intervention trials of a Mediterranean diet and brain outcomes are rare.

The Study

- The study investigated the effects of a Med diet with 28g walnuts [Med] and a Med diet with 3-4 cups green tea + 100g “duckweed” [Green-Med] compared to a general healthy dietary guidelines diet [HDG], looking at rate of brain atrophy and cognitive tests over 18-months.

Findings, Strengths & Limitations

- Age modified brain atrophy, with a rate of 1% decline in participants >50yrs compared to 0.6% in participants <50yrs.
- Left ventricular volume increased [which represents brain atrophy] by 3.1% in the HDG group compared to 1.2% in the Green-MED group. In the >50yrs group both Med diets resulted in 0.8% decline in brain atrophy vs. 1.3% in the HDG group.
- The strengths of the study are the rigorous design conducted over 18-months with brain scans before and after the intervention to sensitively quantify changes in the brain.
- The limitations include that these were secondary outcomes to the main trial, the ‘Med’ diets were not really Mediterranean diets, and there is evidence of some adherence issues for the “duckweed”.

Context

- The study appears to be the first study to specifically use this newly discovered, (poly)phenol rich food [“duckweed”, and it appears to have – with daily intake – exerted significant benefits on the brain.
- But at 40-80g/d carbs, the study possibly tied its hands behind its back with achieving higher (poly) phenol intakes.
- Longer-term interventions designed with cognitive outcomes as primary endpoints are rare.
- There are more encouraging signals than not for the effects of (poly)phenols on the brain.

Application

- Remember how broad a category (poly)phenols are, and don't emphasise merely a single (poly) phenol-rich food source.
- The diversity of pigmentation that denotes flavonoid subclasses also corresponds to the diversity of metabolites in circulation; eat all the colours!

Heart Disease Risk from Replacing Sugar-Sweetened Drinks with Artificial Sweeteners

Keller A, O' Reilly EJ, Malik V, et al. Substitution of sugar-sweetened beverages for other beverages and the risk of developing coronary heart disease: Results from the Harvard Pooling Project of Diet and Coronary Disease. *Preventive Medicine*. 2020;131:105970.

Background

- In both the U.S. and UK populations, high intake of SSB and sugar as a percentage of energy are associated with significant increases in cardiovascular disease and all-cause mortality.
- The role of added sugar has led to interest in the use artificial sweeteners.
- While previous research has looked at AS *per se* as an exposure of interest, no studies have specifically investigated the effects of replacing SSB with AS and other beverages.

The Study

- The study was a pooled analysis of 6 studies, 4 prospective cohorts and 2 RCTs with long-term observational follow-up. The study modelled the effects of replacing SSB with other beverages, including artificially-sweetened beverages [ASB], on heart disease risk.

Findings, Strengths & Limitations

- Per 355ml increase in SSB there was an overall 8% increased risk for CHD events.
- Replacing SSB with ASB was associated with a 12% lower risk for CHD event, while replacing SSB with coffee was also associated with 7% lower risk.
- Strengths include the very large sample size, adequate follow-up period, extensive adjustment for potential confounders/modifiers, and stratified analysis by sex.
- Limitations include low number of events for CHD deaths, low average SSB intake, and older age of the cohorts which could differ from current population intakes.

Context

- The epidemiology of AS intake and health outcomes is fraught with several known confounders, particularly reverse causality.
- No analysis prior to the present study had considered the effects of substitution.
- Whatever debate exists, and may continue, in relation to ASB, the associations with sugar intake are clear.
- Analysing the effects of replacing SSB with ASB thus allowed for a more ecologically valid test of the relationship between SSB, ASB, and disease risk.
- By modelling substitution, the present study was the first in epidemiology to demonstrate the purported role of AS, i.e., replacing SSB with ASB, and a modest risk reduction for heart disease.

Application

- It is important to state that AS are not biological benign. There remain ongoing questions over their safety margins in the food supply.
- Much of the supposed adverse effects of AS are not currently supported by any weight of evidence.
- In the context of CHD management risk, much of the dietary low-hanging fruit is ready to implement, e.g., replacing saturated with polyunsaturated fats.
- There is no good evidence to suggest that a Diet Coke on top of such a dietary pattern poses any concern

What Dietary Interventions Reduce Insulin Resistance in PCOS?

Shang Y, Zhou H, Hu M, Feng H. Effect of Diet on Insulin Resistance in Polycystic Ovary Syndrome. *Journal of Clinical Endocrinology and Metabolism*. 2020;105(10):dgaa425.

Background

- Within the complexity of the pathophysiology of PCOS, one of the more consistent characteristics that is observed across a range of PCOS phenotypes, including both lean and PCOS women with abdominal obesity, is insulin resistance.
- Elevated insulin levels drive elevated androgen levels in PCOS, with potential consequences for ovarian dysfunction.
- What are the effects of dietary interventions on insulin resistance?.

The Study

- The study was a systematic review and meta-analysis of randomised controlled trials [RCTs] investigating the effects of dietary interventions on insulin resistance in women with PCOS, including 19 total trials; 10 used low-carb diets, 4 used the DASH diet, 3 used calorie-restricted diets, 2 used low-fat diets, and 1 used a Mediterranean diet.

Findings, Strengths & Limitations

- All interventions combined led to a decrease in insulin resistance [assessed by HOMA-IR, which is calculated from fasting glucose and fasting insulin measures] of 0.78. The DASH diet was more effective than the low-carb diets in lowering HOMA-IR.
- Fasting insulin and glucose decreased by 4.24mIU/L and 0.11mmol/L, respectively. While both DASH and low-carb were equally effective for insulin, only DASH lowered glucose.
- BMI, weight, and waist circumference decreased by 1.01kg/m², 1.74kg, and 3.25cm, respectively, with energy-restriction the greatest determinant.
- Compared to metformin, there was no significant benefit to dietary interventions.
- Strengths include the clearly defined inclusion criteria and pre-specified analysis with diagnoses of PCOS. Limitations include the small number of trials and participants, the lack of distinction in energy restriction between diets, and the fact that “low-carb” was an average of 40% energy.

Context

- Wider research has suggested benefits to diet independent of metformin, and in combination with metformin and other supplements [e.g., inositol].
- Combination treatment appears most efficacious for PCOS.
- The benefit between DASH and “low” [i.e., moderate] carb may relate to GI/GL of the diets, rather than total carb content, but we need better interventions to examine this.
- Several dietary interventions with a degree of energy restriction and a modification of diet quality improve insulin resistance and fasting glucose levels in women with PCOS.

Application

- DASH and moderate-carb diets show the most consistent effects on insulin resistance in PCOS.
- Where improvements in androgens are sought on top of lowering insulin resistance, there is a case to be made for higher protein and low-GI diets, in the context of energy restriction, which have been shown to significantly improve *both* insulin resistance and androgens.